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Akio Sato

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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER  
LLP

901 NEW YORK AVENUE, NW  
WASHINGTON, DC 20001-4413

EXAMINER

NGUYEN, HUNG D

ART UNIT

PAPER NUMBER

3742

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/562,574 | <b>Applicant(s)</b><br>SATO ET AL. |  |
|                              | <b>Examiner</b><br>HUNG NGUYEN       | <b>Art Unit</b><br>3742            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/30/2009</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is insufficient disclosure because the original filed specification does not explain the structure, the operation and the function of the claimed "rectifier".

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. In claim 1, the recitation of "a rectifier" at line 15 renders the claim indefinite since it is unclear for what such "a rectifier" was. Clarification is needed.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) (previously cited) in view of Nowotny et al. (DE 19909390) new cited.

8. Regarding claim 1, Kinoshita et al. discloses a laser-clad processing apparatus for laser-clad processing a valve-seat portion of a cylinder head comprising: a cylinder-head holding device 23 (Fig. 1) holding the cylinder head 22 (Fig. 1) in an inclined orientation so that a central axial line of said valve seat portion defines a generally vertical direction line (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical position); a laser-processing head ("the laser radiation apparatus, Par. 15) irradiating a laser beam onto a process part of said valve seat portion, while discharging a powdery material to the process part (Par. 29); and a rotator 4 (Fig. 1) rotating around the central axial line of said valve seat portion such that said laser-processing head is inclined with respect to the vertical line (Par. 14), wherein said laser- processing head includes a coaxial nozzle comprising powdery material supply (Par. 27) , configured to provide the powdery material in a direction substantially parallel to the central axial line in an equal amount across the process part of the valve seat portion (Fig. 2 and Fig. 3; Par. 25) except for the swirling chamber, and a rectifier. Nowotny et al. discloses a swirling chamber 1 (Fig. 1) and a rectifier 2 (Fig. 1) (Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to have the swirling chamber, and a

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rectifier, as taught by Nowotny et al., in order to ensure the constant flow of the powder material onto the valve seat portion..

9. Regarding claim 2, Kinoshita et al. further discloses the laser-clad processing apparatus wherein said cylinder-head holding device comprises: an inclination device inclining the cylinder head between two positions 3 (Fig. 1), a first position wherein a central axial line of an inlet valve seat substantially parallel to a vertical line and a second position wherein a central axial line of an outlet valve seat is substantially parallel to the vertical line (Fig. 2 and Fig. 3; Par. 25); and a horizontal-movement device 11 and 16 (Fig. 1) moving the cylinder head in the X-axis direction and in the Y-axis direction, which crosses with the X-axis direction perpendicularly, on a horizontal plane (Par. 26).

10. Regarding claim 3, Kinoshita et al. further discloses the laser-clad processing apparatus wherein the laser-processing head comprises: a laser-beam generator generating a laser beam; and wherein the laser beam passes through the coaxial nozzle (Par. 27).

11. Regarding claim 6, Kinoshita et al. discloses a laser-clad processing method for laser-clad processing a valve-seat portion of a cylinder head comprising: holding the cylinder head in an inclined orientation so that a central axial line of the valve seat portion defines a generally vertical line (Fig. 2 and 3 shows the cylinder head 22 is in an inclining position and the valve-seat 52 is in the vertical line); supplying a powdery material across the valve-seat portion while holding a laser-processing head in an inclined orientation with respect to the vertical direction and rotating the laser-

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processing head around the central axial line of the valve seat portion; and irradiating a laser beam to carry out the laser-clad processing (Par. 28-29) except for the supplying a powdery material into a swirling chamber, and rectifying a swirling flow of the powdery material to flow in a direction substantially parallel to the central axial line to be provided in an equal amount across the valve-seat portion. Nowotny et al. discloses a supplying a powdery material into a swirling chamber 1 (Fig. 1), and rectifying a swirling flow of the powdery material to flow in a direction substantially parallel to the central axial line to be provided in an equal amount across the workpiece (Abstract and English Translation). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to have the supplying a powdery material into a swirling chamber 1, and rectifying a swirling flow of the powdery material to flow in a direction substantially parallel to the central axial line be provided in an equal amount across the valve-seat portion, as taught by Nowotny, in order to have uniform equal amount of powder material deposit onto the valve seat portion.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Satou et al. (US. Pat. 6,838,638 B2) previously cited.

13. Regarding claim 4, the combined references disclose all the claimed features except for the laser-beam generator comprises a plurality of laser diode arrays, and shapes said laser beam by controlling the laser diode arrays depending on a width direction of said valve-seat portion. Satou et al. discloses the laser diode arrays 3 (Fig. 1) and the laser beam shapes are controlled by the laser diode arrays depends on the

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width direction of the valve-seat portion (Col. 8, Lines 23-37). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Kinoshita et al. to add a plurality of laser diode arrays, as taught by Satou et al., for the purpose of controlling the distribution of energy in accordance with a width position of the part to be process.

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Mihashi (JP Pat. 2891378 B2) (previously cited).

15. Regarding claim 5, the combined references disclose all the claimed features as set forth above except for the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head. Mihashi discloses the powdery-material supply 19 (Fig. 1) includes pressurized carrier-gas 29 (Fig. 1) to compressively supply the powdery material to said laser-processing head 21 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the combined references to the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head, as taught by Mihashi, for the purpose of improving the welding quality as weld metal is supplied.

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Nagano et al. (US Pat 6,717,106 B2) (previously cited).

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17. Regarding claim 7, the combined references disclose all the claimed features as set forth above except for the shape of the laser beam has rectangular shape. Nagano et al. discloses a laser beam is a rectangular shape 16 (Fig. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the combined references to have a laser beam shape has a rectangular shape, as taught by Nagano et al., for the purpose of condensing the laser beam for better melting the powder material.

18. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Scalzotto (Pub. No. US 2002/0003132) (previously cited).

19. Regarding claim 8, the combined references discloses all the claimed features except for the laser-processing head is rotated normally and is rotated reversely along said valve-seat portion. Scalzotto, however, teaches the laser focusing head 10 (Fig. 1) connected to the mobile element 12 (Fig. 1) of the laser machine, the mobile element can turn about an axis A/the arrow 14 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in the combined reference to include the laser-processing head is rotate, as taught by Scalzotto, for the purpose of varying the distance between the focusing area of the laser beam and the beam nozzle.

20. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Kawasaki et al. (US Pat. 5,571,430) (previously cited).



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21. Regarding claim 9, the combined references discloses all the claimed features as set forth above except for the rectified flow of the powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction. Nowotny et al. discloses a rectified flow of the powdery material (Abstract and English Translation). Kawasaki et al. discloses a powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction (Fig. 6-7). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in the combined reference to have for the rectified flow of the powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction, as taught by Nowotny et al. and Kawasaki et al., in order to properly melt the powder material after it deposited to the cylinder head.

22. Regarding claim 10, the combined references disclose all the claimed features as set forth above except for the powdery material is melted by irradiating the laser beam behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing. Kawasaki et al. discloses the powdery material PF (Fig. ) is melted by irradiating the laser beam LL (Fig. 6) behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing (Col. 10, Lines 15-52). It would have

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been obvious to one of ordinary skill in the art at the time of the invention was made to modify in the combined reference to have the powdery material is melted by irradiating the laser beam behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing, as taught by Kawasaki et al. in order to melt the powder material within the molten pool in the processing direction.

23. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Lewis et al. (US Pat. 5,837,960) (new cited).

24. Regarding claim 11, the combined references disclose all the claimed features as set forth above except for the laser-clad processing method wherein, when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage. Lewis et al. discloses when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage (Col. 13, Lines 44-48; Col. 22, Lines 18-23). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in the combined reference to have the laser-clad processing method wherein, when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a

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predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage, as taught by Lewis et al., in order to have accurate powder material deposit onto the cylinder head.

25. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita et al. (JP 10286687 A) in view of Nowotny et al. (DE 19909390) and further view of Yomo et al. (JP Pat. 405311385A) (cited by the applicant).

26. Regarding claim 12, Kinoshita et al. discloses all the claimed features as set forth above except for the laser-clad processing method wherein: before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air. Yomo et al. discloses high pressure gas inlet pipe 17 (Fig. 1) is inserted into the powder feed pipe 16 (Fig. 1) and into the transducing box 18 (Fig. 1); the pressure of the gas is reduced in the box 18 (Fig. 1) to a constant pressure, the powder is then supplied to a spraying device from a pipe 19 (Fig. 1) along with the carrier gas. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the combined references to the laser-clad processing method wherein: before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air, as taught by Yomo et al., for the purpose of uniform the thickness of the powder material.

***Response to Amendment***

26. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG NGUYEN whose telephone number is (571)270-7828. The examiner can normally be reached on Monday-Friday, 8:30AM-6PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571)272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG NGUYEN/  
Examiner, Art Unit 3742  
6/19/2009

/Quang T Van/  
Primary Examiner, Art Unit 3742